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Blakely, Sokoloff, Taylor & Zafman
Seventh Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025-1030

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| EXAMINER |
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KAWSAR, ABDULLAH AL

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| ART UNIT | PAPER NUMBER |
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2109

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08/15/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/609,202

Applicant(s)

KNAUERHASE ET AL.

Examiner

Abdullah-Al Kawsar

Art Unit

2109

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :09/08/2003, 01/07/2004, 01/21/2004.

DETAILED ACTION

1. Claims 1-30 are pending.

Information Disclosure Statement

2. The information disclosure statement filed 09/08/2003 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because it is not in proper format and there is no place to initiate or sign the form. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

3. The information disclosure statement filed on 01/07/2004 with reference 5 and 7 on sheet 4 has not been considered by the examiner because reference 7 was not in English and there wasn't any translation provided and reference 5 is missing the actual document.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1 - 30 are rejected under 35 U.S.C. 102(a) as being anticipated by Cota-Robles et al (Cota-Robles) US Pre-Grant Publication 2003/0037089.

As per claim 1, Cota-Robles Discloses:

- evaluating processor state information associated with a processor; and managing one or more virtual machines using the processor state information (paragraph 4 lines 1-9, “processors frequently have “performance counters,” software-configurable evaluate and tune the performance of other applications.” And paragraph 5 lines 1-4, “A Virtual Machine Monitor (VMM) is a software program that controls physical computer hardware and presents programs executing within a Virtual Machine” paragraph 23 lines 18-21, “virtual machine monitor to enable a virtual machine system to guarantee adequate scheduling Quality of Service (QoS) to real-time applications executing in virtual machines”) performance monitoring software use performance counter(processor state information) to evaluate performance of the of the processor. VMM is a monitoring application that monitors virtual machine.

Art Unit: 2109

As per claim 2, the rejection of claim 1 incorporates and further Cota-Robles discloses:

- monitoring the processor; and gathering the processor state information (paragraph 4 lines 7-9, “Performance monitoring applications use these counters and events to evaluate and tune the performance of other applications.”) evaluating processor counters inherently means gathering the information for evaluating as claimed.

As per claim 3, the rejection of claim 1 incorporates and further Cota-Robles discloses:

- further comprising changing time quanta assigned to the one or more virtual machines if triggered by the processor state information (paragraph 27 lines 15-20, “the VMM 107 must allocate the computing resources to provide adequate scheduling Quality of Service (QoS) to the real-time application(s), i.e., the VMs are scheduled for execution with sufficient frequency and for sufficient durations that the deadlines for their real-time applications can be met”) providing adequate scheduling time for process means changing time as needed for task to complete.

As per claim 4, the rejection of claim 3 incorporates and further Cota-Robles discloses:

- wherein the changing comprises increasing or decreasing the time quanta assigned to the one or more virtual machines (paragraph 32 lines 12-23, “If the active real-time scheduling QoS, the VMM 107 can make necessary adjustments to the value of X for the VM”)

As per claim 5, the rejection of claim 1 incorporates and further Cota-Robles discloses:

- wherein the processor state information comprises at least one of the following: characteristics of the processor, history of the processor, characteristics of the one or more

Art Unit: 2109

virtual machines, history of the one or more virtual machines; event monitoring (EMON)

data, and E86MON data (paragraph 4 lines 1-7, "processors frequently have "performance counters," software-configurable registers that count occurrences of various performance "events." Typical events include "instructions retired" and "processor cycles," the ratio of which is the well-known metric Instructions Per Clock (IPC), as well as various types of cache misses.") events are processor event data that are monitored.

As per claim 6 the rejection of claim 1 incorporates and further Cota-Robles discloses:

- wherein the managing comprises swapping between the one or more virtual machines using the processor state information (paragraph 30 lines 1-4, " Within a VM, when the active process or thread completes its work, or blocks before completing its work, its state is saved by the guest OS and the execution is switched to another process or thread." And paragraph 33 lines 3-7, "The processor is assumed to manage the state of OS processes and threads, that changes upon a process or thread switch or upon a transition from one VM to another.") state informations are recorded in the system and used to transfer(swap) between VM.

As per claim 7, the rejection of claim 1 incorporates and further Cota-Robles discloses:

- wherein the managing is performed by a virtual machine manager (VMM) comprising a state management unit to evaluate the processor state information and manage the one or more virtual machines (paragraph 5 lines 1-4, "A Virtual Machine Monitor (VMM) is a software program that controls physical computer hardware and presents programs executing within a Virtual Machine" and paragraph 4 lines 7-9, "Performance monitoring applications use

Art Unit: 2109

these counters and events to evaluate and tune the performance of other applications.” Paragraph 32 lines 18-21, “virtual machine monitor to enable a virtual machine system to guarantee adequate scheduling Quality of Service (QoS) to real-time applications executing in virtual machines”) VMM is the monitoring software with management unit that manages the virtual machines.

As per claim 8, the rejection of claim 7 incorporates and further Cota-Robles discloses:

- wherein the VMM is further to monitor the processor and gather the processor state information (Paragraph 29 lines 12-17, “detection of real-time process and/or thread switches within the VMs 103, 105 enables the VMM 170 to monitor scheduling decisions by the guest OSs 109, 111 and to determine if the current computing resource requirements allow the VMs to provide adequate scheduling QoS”) detecting the process to determine the resources(processor state) means gathering information.

As per claim 9, Cota-Robles discloses:

- a processor; a virtual machine manager (VMM) coupled with the processor, the VMM having a state management unit to manage one or more virtual machines, coupled with the VMM, using processor state information (paragraph 4 lines 1-9, “processors frequently have "performance counters,"types of cache misses. Performance monitoring applications use these counters and events to evaluate and tune the performance of other applications.” And paragraph 5 lines 1-4, “A Virtual Machine Monitor (VMM) is a software program that controls physical computer hardware and presents programs executing within a

Art Unit: 2109

Virtual Machine”) performance monitoring software use performance counter(processor state information) to evaluate performance of the of the processor. VMM is a monitoring application that monitors virtual machine.

As per claim 10, the rejection of claim 9 incorporates and further Cota-Robles discloses:

- monitor the processor; gather the processor state information associated with the processor; and evaluate the processor state information (paragraph 4 lines 7-9, “Performance monitoring applications use these counters and events to evaluate and tune the performance of other applications.”) evaluating processor counters inherently means gathering the information for evaluating as claimed.

As per claim 13, the rejection of claim 9 incorporates and further Cota-Robles discloses:

- wherein the processor comprises one or more processors having at least one of the following: microprocessors, hyperthreaded processors, digital signal processors, and microcontrollers (paragraph 5 lines 1-4, “A Virtual Machine Monitor (VMM) is a software program that controls physical computer hardware (e.g., a processor, memory, and disk and CD-ROM drives) and presents programs executing within a Virtual Machine” and paragraph 23 lines 29-32, “scheduling information also can be used, for example, by multiprocessor systems and multithreaded processors to better assign instruction streams to particular processors and/or hardware contexts”)

Art Unit: 2109

As per claim 14, the rejection of claim 9 incorporates and further Cota-Robles discloses:

- wherein the one or more processors comprise at least one of the following:

microcode, macrocode, programmable logic, and hard coded logic (paragraph 6 lines 4-7, “If an OS (or VMM) schedules a thread or process (or VM) with sufficient frequency and for sufficient duration that the thread or process (or VM) is able to complete its computations before their respective deadlines” and paragraph 12 lines 1-2, “FIG. 3 is a block diagram of one embodiment of microcode components used in conjunction with the method of FIG. 2A”)

As per claim 15, the rejection of claim 9 incorporates and further Cota-Robles discloses:

- further comprising at least one of the following: a personal computer, a mainframe computer, a handheld device, a portable computer, a set-top box, an intelligent appliance, a workstation, and a server (paragraph 5 lines 1-4, “A Virtual Machine Monitor (VMM) is a software program that controls physical computer hardware (e.g., a processor, memory, and disk and CD-ROM drives) and presents programs executing within a Virtual Machine”)

As per claim 16, the rejection of claim 9 incorporates and further Cota-Robles discloses:

- wherein the one or more virtual machines comprise guest software, the guest software having at least one of the following: an operating system and a software application (
Paragraph 27 lines 3-7, “Each VM allocate its shares of the computing resources to its guest operating system (OS) and to any user-level applications running in that particular VM, such as guest OS1 109 and applications 113 within VM A 103”)

Art Unit: 2109

As per claim 18, the rejection of claim 17 incorporates and further Cota-Robles discloses:

- wherein the VMM comprises a state management unit to monitor the processor (

Paragraph 29 lines 12-17, "detection of real-time process and/or thread switches within the VMs 103, 105 enables the VMM 170 to monitor scheduling decisions by the guest OSs 109, 111 and to determine if the current computing resource requirements allow the VMs to provide adequate scheduling QoS"). VMM monitoring the scheduling decision is the management unit.

Claims 11 and 29 are apparatus and computer readable medium claims of claim 6 above.

They are therefore rejected under the same rational.

Claims 12 and 27 are apparatus and computer readable medium claims of claim 4 above.

They are therefore rejected under the same rational.

Claims 20 and 26 are system and computer readable medium claims of claim 3 above.

They are therefore rejected under the same rational.

Claims 19 and 28 are system and computer readable medium claims of claim 5 above.

They are therefore rejected under the same rational.

Claims 18 and 30 are system and computer readable medium claims of claim 7 above.

They are therefore rejected under the same rational.

Art Unit: 2109

Claim 17 is a system claim of claim 9 above. It is therefore rejected under the same rational.

Claim 24 is computer readable medium claim of claim 1 above. It is therefore rejected under the same rational.

Claim 25 is computer readable medium claim of claim 2 above. It is therefore rejected under the same rational.

Claims 21, 22 and 23 are system claims of claim 13, 15 and 16 above. They are therefore rejected under the same rational.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

TITLE: Tracking operating system process and thread execution and virtual machine execution in hardware or in a virtual machine monitor, US 20030037089 A1 .

TITLE: Method for measuring quantity of usage of CPU, US Patent No. 6,804,630 B2.

TITLE: Mechanism for restoring, porting, replicating and checkpointing computer systems using state extraction, US Patent No. 6,95,966 B1.

Art Unit: 2109

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Abdullah-Al Kawsar whose telephone number is 571-270-3169. The examiner can normally be reached on 7:30am to 5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chameli Das can be reached on 571-272-3696. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AK

Chameli C. Das
CHAMELI DAS
SUPERVISORY PATENT EXAMINER
8/3/07